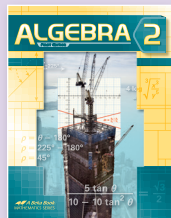


MATHEMATICS: Algebra 2



Algebra 2, building from a foundation of basic algebra, develops confidence in problem-solving strategies through application of in-depth algebraic skills. Students will gain thorough exposure to algebraic techniques applied in many branches of mathematics. Concepts such as matrices, linear programming, and hypothesis testing will pique student interest in mathematical application. An increased understanding of algebraic concepts will result in thorough preparation for further study in mathematics.

Algebra 2 builds from mathematical ideas to practical problem solving with applications in business, science, sports, medicine, and statistics. Students will learn to analyze results and make informed decisions for everyday life.

For this grade level, see also Geometry on p. 176.

Also available: Consumer Mathematics and Business Mathematics on Electives pp. 199–203.

Features:

- Flexible pacing options in curriculum
- Review exercises for every section (83)
- Mid-chapter reviews (12)
- Chapter reviews (12)
- Word problem review
- Quarter reviews (2)
- Semester Review
- Final Review

Evaluation:

- Quizzes (50)
- Tests (8)
- Quarter Exams (2)
- Semester Exam
- Final Exam

► **RED** indicates first introduction of content.

Basic Algebra

- Order of operations
- Algebraic properties
- Exponent properties
- Negative exponents
- Words as Algebraic Expressions
- Addition and Subtraction of Polynomials
- Multiplication and Division of Polynomials
- Special Cases of Multiplication
- Factoring Special forms
- Sum and Difference of Odd and Even Powers
- Factoring by Grouping

Equations and Inequalities

- Equations in one variable
 - Absolute value
 - Literal
 - Quadratic
 - Zero Factor property
 - Extracting the root
 - Completing the square
 - Quadratic formula
 - Discriminant
 - Rational
 - Cross-multiplication
 - LCD
 - Radical
- Inequalities
 - Interval Notation
 - Linear
 - Compound
 - Absolute Value
- Complex numbers
 - Imaginary unit
 - Powers of i
 - Standard form
 - Arithmetic
 - Quadratic with complex solutions

Polynomial Equations and Inequalities

- Rational Zero Theorem
- Factor Theorem
- Remainder Theorem
- Synthetic Division
- Solving a polynomial equation
- Equations of the quadratic form
 - Integer exponents
 - Rational exponents
- Nonlinear absolute value equations
- Polynomial Inequalities
 - Critical number
 - Rational inequalities

Functions and The Cartesian Plane

- Two-variable linear equation
- Distance formula
- Midpoint formula
- Slope formula
- Intercepts
- Graphing with slope and point
- Standard form
- Slope-intercept form
- Point-slope form
- Parallel and Perpendicular lines
- Direct variation
- Inverse variation
- Functions
 - Vertical line test
 - Algebraic test
 - Notation
 - Evaluation
 - Domain
 - Range
 - Types of functions
 - Quadratic
 - Constant
 - Absolute value

MATHEMATICS: Algebra 2 *cont.*

Functions and The Cartesian Plane *cont.*

- Types of functions *cont.*
 - Radical
 - Rational
- *Combination of Functions*
- *Composition of Functions*
- *Translational Graphing*
 - Parent function
 - Standard graphing form
- Rigid and Nonrigid Transformations
- Parabola Vertex Formula

System of Equations and Inequalities

- Intersecting, parallel, and coincident lines
- Substitution method, Elimination method
- Parameter
- Three-variable linear systems
- Elementary row-operations
 - Two-variable inequalities
- System of two-variable inequalities
 - Intersection
 - Unbounded, bounded
 - Boundary line
- Linear programming
 - Objective function
 - Constraints
 - Feasible solution

Matrices

- Definition
- Parts and types of matrices
- Arithmetic with matrices
- Matrix multiplication
- Identity matrix
- Inverse matrix
- Elementary row operations
- Gaussian elimination
 - Augmented matrix
 - Triangular form
- Gauss-Jordan elimination
 - Diagonal form
- Determinants
- Diagonal
- Antidiagonal
- Cramer's rule
- Matrix inversion
- Solving by matrix inversion
- Adjugate matrix

Exponential and Logarithmic Functions

- Finding inverse of a function
- One-to-one function
- Horizontal line test
- Evaluating exponential functions
- Translational graphing of exponential functions
- Logarithmic functions
 - Common logarithmic function
 - Natural logarithmic function
- Converting between exponential and logarithmic form
- Properties of logarithms

- Expanding logarithmic expressions
- Condensing logarithmic expressions
- Change of base formula
- Solving exponential and logarithmic equations
 - Inverse properties, exponentiation, taking logarithm of both sides
- Application of logarithms
 - Bacteria growth, Interest formula, Newton's law of cooling, Sound level

Trigonometry

- Angle properties
- Classification of angles
- Sum of angles
- Right triangle properties
- **Right triangle setup**
- Similar polygons
- Trigonometric functions
- Trigonometric reciprocal functions
- Using calculator
 - Inverse
 - Reciprocal
- Radian
- Special triangle
 - 30°-60°-90° triangle
 - 45°-45°-90° triangle
- Angles on the Cartesian plane
 - Reference angle
 - Reference triangle
 - Coterminal angles
 - ASTC
- Trigonometric Equations
- Unit Circle

Sequences, Series, and Counting

- Arithmetic Sequences
- Series
 - Summation notation
 - Series formulas: constant, consecutive integers, consecutive squares
- Mathematical induction
- Geometric Sequences
 - Converging, Diverging
- Finite Geometric Series
- Infinite Geometric Series
- Counting
- Permutation
- Combination
- Binomial Theorem

Probability

- Relative frequency
- Mutually and non-mutually exclusive events
- Probability of multiple events
 - Independent and dependent events
- Frequency distribution
- Relative frequency distribution
- Probability density function
- Uniform probability distribution
- Geometric probability

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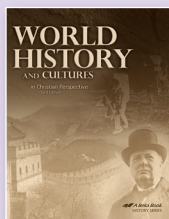
MATHEMATICS: Algebra 2 *cont.*

Statistics

- Descriptive and inferential statistics
- Measures of center
 - Mean, median, mode
- Measure of dispersion
 - Range
 - Mean deviation

- Standard deviation
- Variance
- Normal distribution
- Standard normal distribution
- Calculating z-score
- Sampling Distribution
- Central Limit Theorem
- Hypothesis Testing

HISTORY & GEOGRAPHY: World History



World History and Cultures is written and taught from the Christian perspective. Basic to this perspective is the conviction that God is the Creator of the universe and the Controller of history. Because the focal point of history is the birth of Christ, *World History and Cultures* takes the view that all history is either pointing toward the birth of Christ or looking back to it. Students study how God used events before the birth of Christ to prepare the world for His coming. Then, after His birth, they trace the impact of Christianity on the events of world history.

The Christian perspective of *World History and Cultures* helps students see the sovereign hand of God in history, as well as the consequences of man's choices. The Providence of God has guided history for His glory. Yet each person is free to choose whether to obey God and be used by Him, or to disobey and suffer the consequences. Thus world history also illustrates the truth of Proverbs 14:34: "Righteousness exalteth a nation: but sin is a reproach to any people."

Added Enrichment

- Special feature boxes (56):
 - Provide a framework for understanding the concepts in history
 - Explore language and writing through the ages
 - Give insight to the people and events of history
- Maps correlating to text (84)

Evaluation

- Reading quizzes (30)
- Review quizzes (40)
- Geography map projects (8; each counts as quiz grade)
- Current events (32; each counts as quiz grade)
- Tests (8), 9-weeks exam (2)
- Semester exam, final exam

➤ RED indicates first introduction of content.

Foundations for Studying History

- Creation versus evolution
- Capital punishment
- Beginning of languages, nations, and races: Nimrod and Babel

Asia and Africa: The Beginning of Civilization

- Cradle of Civilization: Fertile Crescent and Mesopotamia (c. 2300–1800 B.C.):
 - Sumer:
 - Cuneiform, culture, civilization, education, architecture, trade, society, religion
 - Mathematics, government
 - Settlements: Eridu, Uruk, Ur
 - Golden Age of Ur, Epic of Gilgamesh
- Middle East (c. 1800 B.C.–A.D. 700s):
 - Old Babylonian Empire:
 - Hammurabi and the law
 - Place-value notation, Babylonian Genesis
 - Hittite Empire
 - Assyrian Empire: Tiglath-pileser I, Nineveh
 - New Babylonian Empire: Nebuchadnezzar and Daniel
 - Persian Empire: Cyrus the Great, Darius I, and Xerxes I
 - Israel: Patriarchs, Exodus, Moses, Decalogue, theocracy, David, and Divided Kingdom
 - Hebrew and Arabic language

- Rise of Islam: Byzantine Empire, Constantinople, and Mohammed
- Middle East (c. 1800 B.C.–A.D. 700s)
 - Missionary efforts:
 - Ion-Keith Falconer and Samuel Zwemer
- Other Asian cultures (c. 2000 B.C.–A.D. 1800s):
 - India: Indus River, Hinduism, caste system, and Buddhism
 - Ancient Chinese dynasties
 - Chinese language
 - Japan: Shinto religion
- Egypt—Gift of the Nile (c. 2300 B.C.–A.D. 1700s):
 - History and language: Herodotus and the Rosetta Stone
 - Religion: *Book of the Dead*
 - Thebes
 - Old, Middle, and New Kingdom
- Other African cultures (c. 2300 B.C.–A.D. 1700s):
 - Land of Phut and Cush
 - Ethiopia:
 - Kingdom of Aksum and Ethiopian Orthodox Church:
 - Piankhi, Ebed-melech
 - Early Christianity in North Africa: Simon of Cyrene, Tertullian, Clement of Alexandria, Athanasius, and Augustine
 - Other empires and kingdoms:
 - Ghana, Mali, Songhai, and Kongo:
 - Mansa Musa and King Ewuare